

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
7 October 2004 (07.10.2004)

PCT

(10) International Publication Number  
**WO 2004/086552 A3**

(51) International Patent Classification<sup>7</sup>: **H01M 8/02, 8/04**

(21) International Application Number:  
PCT/CA2004/000440

(22) International Filing Date: 24 March 2004 (24.03.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/457,459 25 March 2003 (25.03.2003) US

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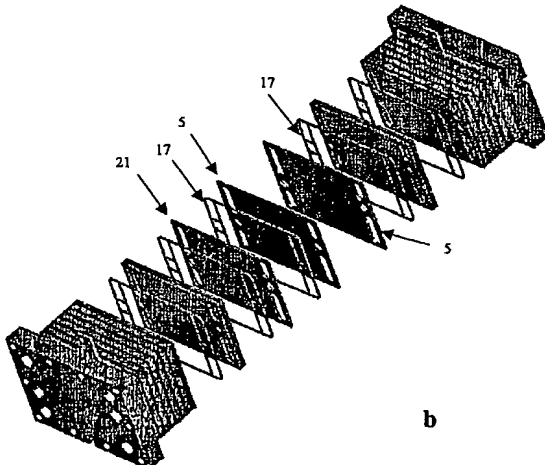
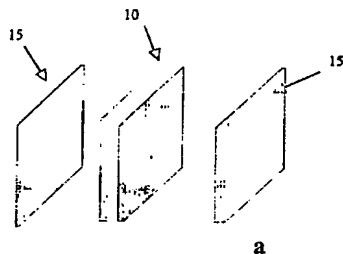
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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,

[Continued on next page]

(54) Title: **PROCESS FOR SEALING PLATES IN AN ELECTROCHEMICAL CELL**



(57) Abstract: There is provided a process for sealing a coolant plate to an adjacent bi-polar plate or coolant plate in an electrochemical cell. The first coolant plate comprises at least one mating region for mating with a complementary region on the adjacent plate, the adjacent plate is a second coolant plate or a bipolar plate of the electrochemical cell, and the first coolant plate and the adjacent plate each comprise a polymer and conductive filler. The process comprises the step of welding the mating region to the complementary region to create a seal formed by the polymer at the mating region and the complementary region. Welding may be done using resistance welding or vibration welding processes.

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KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) **Date of publication of the international search report:**  
28 July 2005

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA2004/000440

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 H01M8/02 H01M8/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 H01M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/000640 A1 (MERCURI ROBERT ANGELO) 2 January 2003 (2003-01-02) paragraphs '0036!, '0067!, '0077! - '0079!	1-26
X	WO 02/091506 A (THE MORGAN CRUCIBLE COMPANY PLC; TURPIN, MARK, CHRISTOPHER; BOFF, JAME) 14 November 2002 (2002-11-14) cited in the application page 4, line 4 - line 9 page 4, line 22 - page 5, line 30 page 7, line 25 - page 8, line 13 claims 4,10,11 ----- -/--	1-15, 18-26

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

26 May 2005

Date of mailing of the international search report

01/06/2005

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA2004/000440

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 01/80339 A (NEDSTACK HOLDING B.V; MIDDELMAN, ERIK; VAN DER ZIJDEN, ARTHUR) 25 October 2001 (2001-10-25) page 4, paragraph 2 page 6, paragraph 2 -----	1,21,22
A	EP 1 189 297 A (MITSUI TAKEDA CHEMICALS, INC) 20 March 2002 (2002-03-20) paragraphs '0006! - '0013!, '0035! - '0041! -----	13
A	WO 00/44005 A (E.I. DU PONT DE NEMOURS AND COMPANY) 27 July 2000 (2000-07-27) page 4, line 14 - page 5, line 9 -----	12
P,X	DE 101 59 007 A1 (SCHUNK KOHLENSTOFFTECHNIK GMBH) 12 June 2003 (2003-06-12) the whole document -----	1-26

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/CA2004/000440

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003000640 A1	02-01-2003	US 2002179230 A1 AU 2003280421 A1 CA 2489678 A1 EP 1531990 A1 WO 2004002738 A1 BR 0209757 A EP 1420952 A1 TW 570867 B WO 02098661 A1	05-12-2002 19-01-2004 08-01-2004 25-05-2005 08-01-2004 27-07-2004 26-05-2004 11-01-2004 12-12-2002
WO 02091506 A	14-11-2002	CA 2445282 A1 CN 1507665 A EP 1386367 A2 GB 2375224 A ,B WO 02091506 A1 JP 2004536424 T TW 583782 B US 2004151972 A1	14-11-2002 23-06-2004 04-02-2004 06-11-2002 14-11-2002 02-12-2004 11-04-2004 05-08-2004
WO 0180339 A	25-10-2001	NL 1014405 C1 AU 3782101 A EP 1290741 A2 WO 0180339 A2 US 2004023095 A1	20-08-2001 30-10-2001 12-03-2003 25-10-2001 05-02-2004
EP 1189297 A	20-03-2002	CA 2357247 A1 EP 1189297 A2 JP 2002164063 A US 2002055030 A1	13-03-2002 20-03-2002 07-06-2002 09-05-2002
WO 0044005 A	27-07-2000	AT 254334 T BR 0008588 A CA 2352380 A1 CN 1337048 A DE 60006490 D1 DE 60006490 T2 EP 1153401 A1 JP 2002535173 T WO 0044005 A1 US 6379795 B1	15-11-2003 19-11-2002 27-07-2000 20-02-2002 18-12-2003 16-09-2004 14-11-2001 22-10-2002 27-07-2000 30-04-2002
DE 10159007 A1	12-06-2003	AU 2002358064 A1 WO 03047017 A2	10-06-2003 05-06-2003